ZT-4



Tonnage Load Module

By Toledo Integrated Systems

User's Manual

17618

ZT-4
Load Module
User's Manual

Revision: A

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Limited Warranty

This unit is warranted by the manufacturer, Toledo Transducers, Inc., to be free of defects in workmanship and materials for one year from date of manufacturer's shipment. This warranty is limited to repairing or replacing products which manufacturer's investigation shows were defective at the time of shipment by the manufacturer.

All products subject to this warranty must be returned for examination, repair or replacement

F.O.B. to: Toledo Transducers, Inc.
6834 Spring Valley Drive
Holland, Ohio 43528

The express warranty set forth herein is in lieu of all other warranties, expressed or implied, including without limitation any warranties of merchant-ability or fitness for a particular purpose. All such warranties are hereby disclaimed and excluded by the manufacturer.
Repair or replacement of defective products as provided above is the sole and exclusive remedy provided thereunder. The manufacturer shall not be liable for any further loss, damages, or expenses, including incidental or consequential damages, directly or indirectly arising from the sale or use of this product.

Any unauthorized repair voids this warranty.

There are no warranties that extend beyond those expressly set forth herein.

Features Overview

- Designed to work with strain gage sensors and load cells. The ZT-4 can also accept input from 4-20mA current output sensors or voltage output sensors.
- Four independent channels for accommodating up to eight sensors.
- Simultaneously provides normal peak, reverse peak, and track voltage outputs. Channel 1 provides the associated 0-20mA current outputs.
- Built-in threshold trigger simplifies installation. External probe trigger can also be used when situation required.
- LED bar-graph voltmeter for easy setup and diagnostic.
- Built-in 1 Mega Ohm calibration shunt resistor. Channel 1 accepts user selected external shunt resistor.
- x1 and x10 amplifier gain ranges to work with either strong or weak signal from the load sensor.
- Auto-Zero can be selected using dip switches to compensate for zeroing errors caused by environmental changes such as temperature, humidity, and etc.
- Electrical noise rejection filter can be enabled when situation required.
- Plug-in connectors for easy wiring and installation.
- Standard DIN Rail mount simplifies systems integration.
- Modular with common bus design allows future upgrade and expansion.

The ZT-4 tonnage load module is designed for critical force measurement applications where accuracy, extreme stability, and dependable noise rejection is essential. It is equipped with an LED bar-graph voltmeter for easy setup and diagnostic. The ZT-4 is DIN rail mountable and is designed to interface with a PLC analog card and to display output through a human machine interface (HMI).

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Specifications

Channels	One to four channels
Transducers	Full bridge, 120 to 1000 ohms. Maximum of (2) 350 ohm sensors, paralleled per channel.
Sensor Excitation	Built in +10VDC at 250mA max.
Balance Range	+/- 1mV/V of sensor imbalance
Gain Ranges	Low range = x50 to x550 adjustable High range = x500 to x5,500 adjustable
Calibration Shunt	Built-in 1 mega ohm (.1%). Channel 1 accepts custom shunt.
Output Range	Normal Peak and Reverse Peak = 0 to 10VDC Track output = -10 to +10VDC Channel 1 also provides current outputs: Normal Peak and Reverse Peak = 0 to 20mA Track output = -20 to +20mA
Circuit Inaccuracy	+/- .1% of full scale max.
Circuit Non-linearity	+/- .02% of full scale max.
Auto Zero	Time constant = 10 seconds. DIP switch selectable.
Frequency Response	DC to 5,000 Hz
Speed Limit	2000 SPM max. when triggered by External Probe 500 SPM max. when triggered by Internal Threshold
Operating Temperature	-4 to 158 degree F, or -20 to 70 degree C
Display	LED bar-graph voltmeter for setup and diagnostic
Trigger	Internal Threshold (.35V / .70V) base on Channel 1 signal, or External Probe.
Probe Input	NPN/PNP proximity probes, solid state or dry contact relays. Built-in 24VDC at 80mA max. supplies power to the probe.
Input Power	24VDC at 0.5A max. Automatic resettable fuse.
Dimensions	1.9" W x 4.1" H x 4.7" D
Mounting	Standard DIN Rail mount

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➢ Installation

Mounting the ZT-4

The ZT-4 is designed to clip onto standard top hat DIN rail (TH 35-7.5 or TH 35-15).

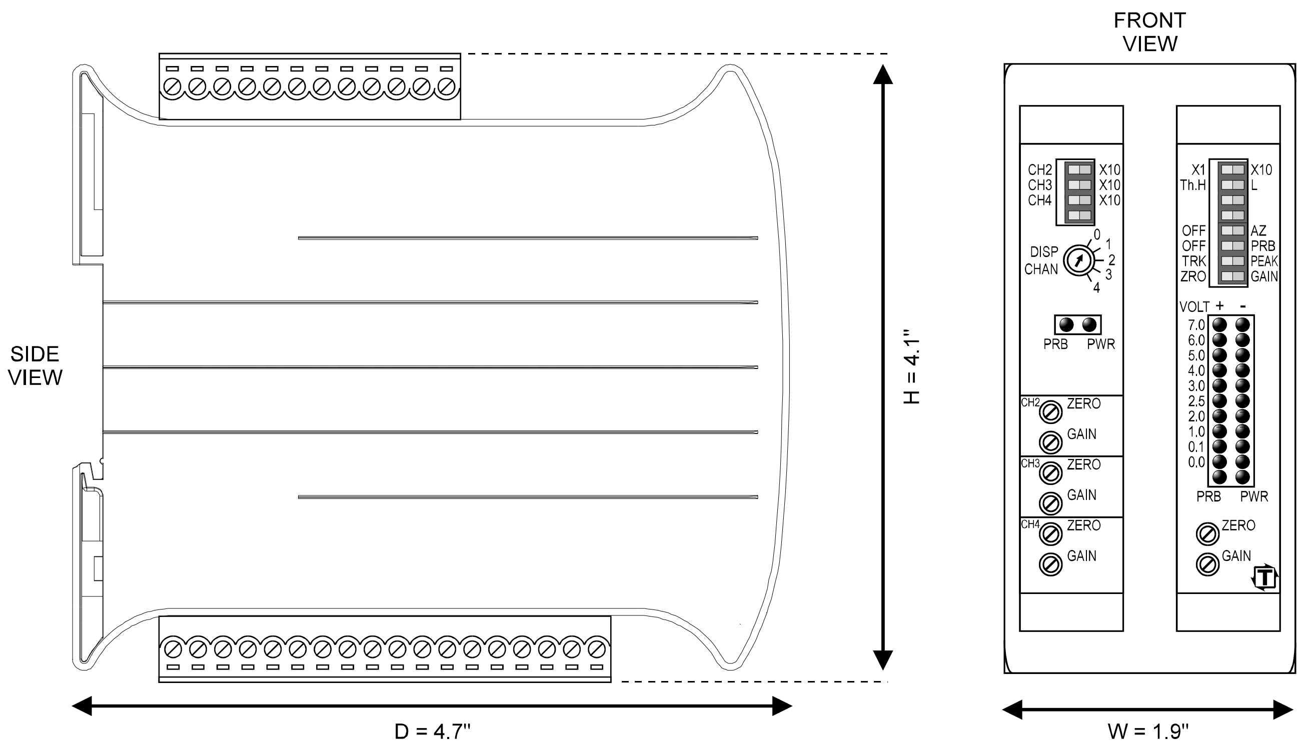


Figure 1: Mounting Dimensions

DC Power Connection

24VDC power is connected to the ZT-4 as shown in Figure 2.

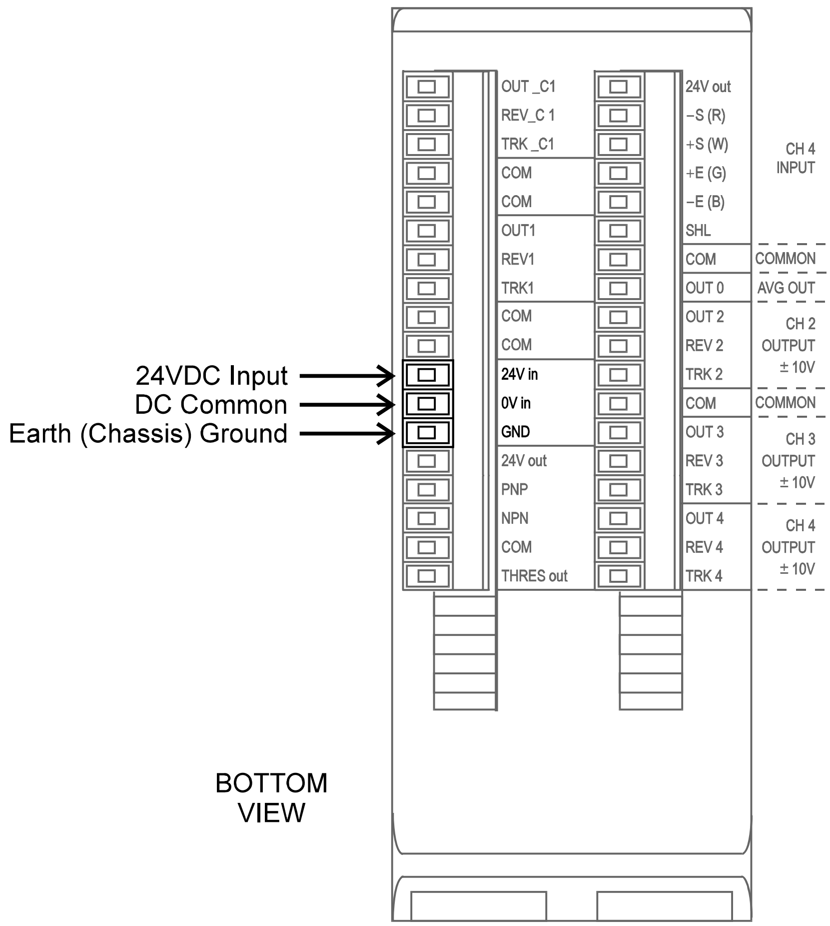


Figure 2: DC Power Wiring

Notes:

1) The 24VDC source can be in range from 18VDC to 32VDC.
2) It is important to connect an Earth Ground to the GND terminal.
3) Do not apply power until all the wirings in this Installation Section are done.

Shunt Resistors

Each channel comes with an 1M ohm built-in shunt resistor. Channel 1 is capable of utilizing either the 1M ohm built-in shunt resistor or a user-specified external shunt resistor.

TOP VIEW

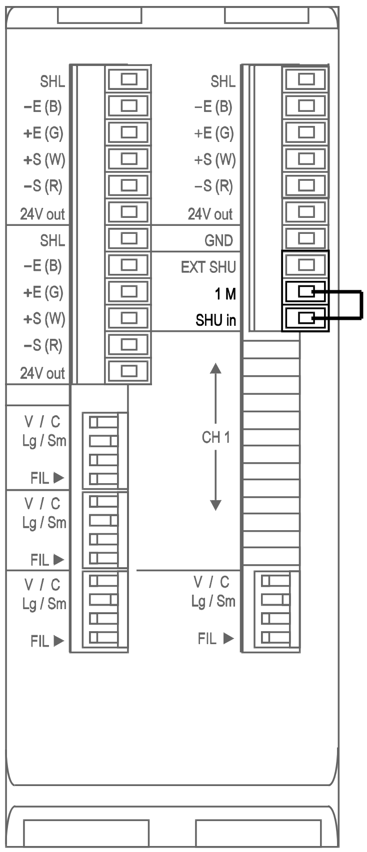


Figure 3:
Channel 1 Built-In 1M Ohm Shunt Resistor Wiring

OR

TOP VIEW

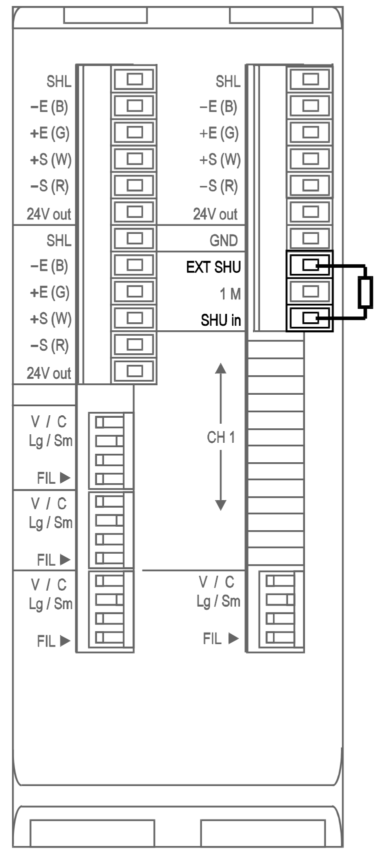


Figure 4:
Channel 1 External Shunt Resistor Installation

Shunt resistor only works directly with the Wheatstone bridge type sensor. It has no effect if other type of sensor is used.

Strain Gage Sensor Connection

Refer to Figure 5 for the procedures below:

Connection:

1) Prepare the sensor cable for termination as described in Illustration A on page 14.

2) Remove the Phoenix plug from its socket on the top of the unit (CH1-3) or from the bottom of the unit (CH4) and wire the sensor cable as described in Illustration B on page 15.

3) The Phoenix plug can then be inserted back into its socket.

Configuration:

1) Set the V / C dip-switch for the corresponding channel to "V" position for voltage sensor. Strain Gage sensor outputs voltage signal.

2) Set the Lg / Sm dip-switch for the corresponding channel to "Sm" position for small signal. Strain Gage sensor outputs un-amplified signal (small signal).

3) Set FIL dip-switch for the corresponding channel to "No filter" position. Apply this filter only when electrical noise becomes a problem at the analog output.

Note: There are four sets of Sensor Signal Configuration dip-switches. Each set is for the corresponding channel.

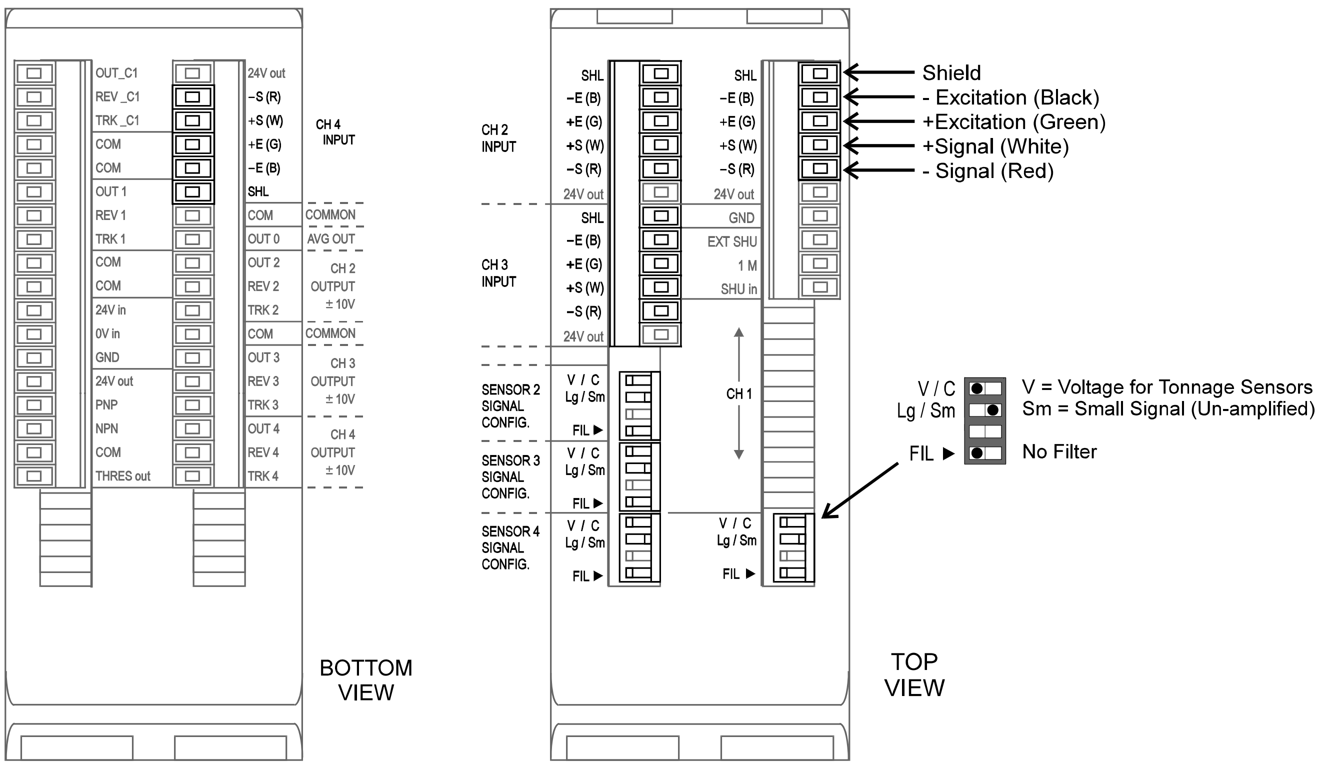


Figure 5: Strain Gage Sensor Input

Illustration A - Sensor Cable Termination

1) Strip the sensor cable as shown in Figure 6 below. Be sure not to knick any of the signal conductors or cut the braid shield.

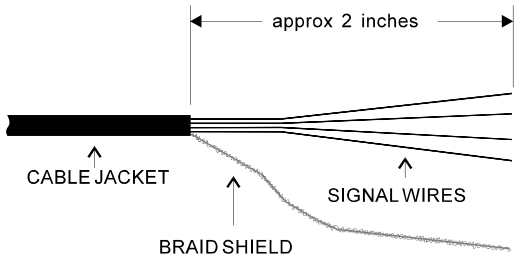


Figure 6: Strain Gage Sensor Cable Stripping

2) Strip approximately ¼" of insulation from each of the four signal conductors.

Note: If your sensor cable is not double shielded with both foil and a braid, electrical noise may affect your output readings.

Illustration B - Sensors Connection

The ZT-4 accepts the signals from Toledo Transducers T-400 sensors as well as other strain gage sensors. Figure 7 illustrates the sensor connections.



Tension connection shown. For compression connections, switch the red and white wires

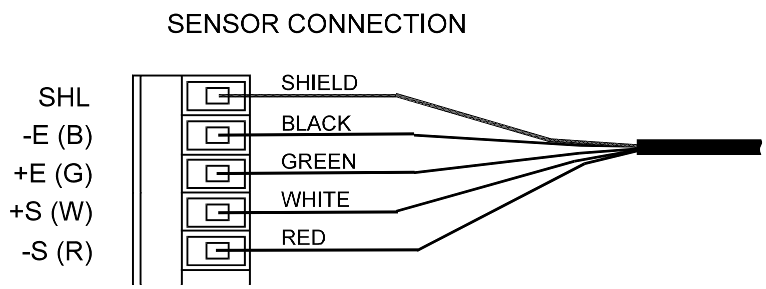


Figure 7: Strain Gage Sensor Wiring

20mA-out Sensor Connection

The 20mA-out Sensor applies to sensors with output up to +/-20mA including the 4-20mA output sensor. Refer to Figure 8 for the procedures below:

Connection:

1) Remove the Phoenix plug from its socket on the top of the unit (CH1-3) or from the bottom of the unit (CH4) and wire the sensor cable as shown.

2) The Phoenix plug can then be inserted back into its socket.

Configuration:

1) Set the V / C dip-switch for the corresponding channel to "C" position for current output sensor. 20mA-out sensor outputs current signal.

2) Set the Lg / Sm dip-switch for the corresponding channel to "Lg" position for large signal. 20mA-out sensor outputs amplified signal (large signal).

3) Set FIL dip-switch for the corresponding channel to "No filter" position. Apply this filter only when electrical noise becomes a problem at the analog output.

Note: There are four sets of Sensor Signal Configuration dip-switches. Each set is for the corresponding channel.

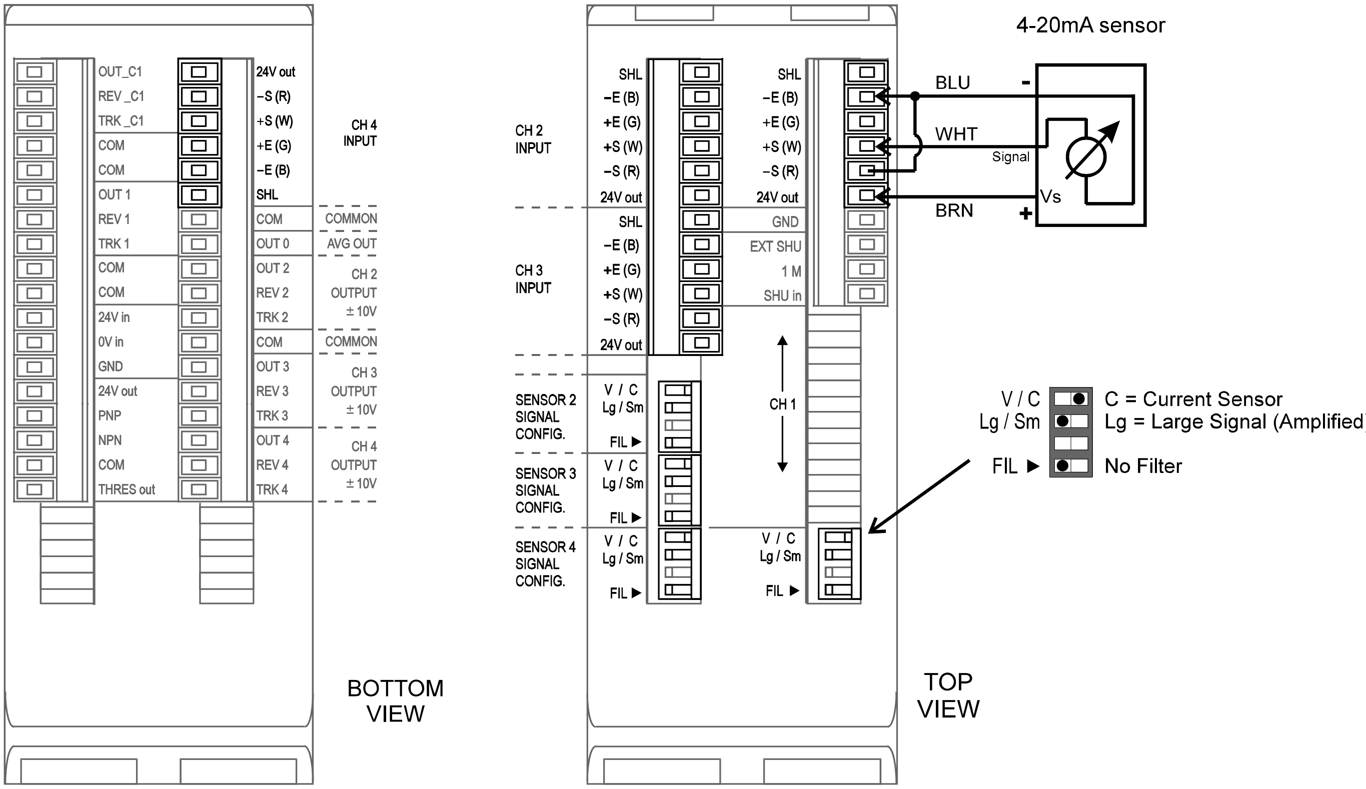


Figure 8: 20mA-out Sensor Input

10V-out Sensor Connection

The 10V-out Sensor applies to sensors with output up to +/-10V. Refer to Figure 9 for the procedures below:

Connection:

1) Remove the Phoenix plug from its socket on the top of the unit (CH1-3) or from the bottom of the unit (CH4) and wire the sensor cable as shown.

2) The Phoenix plug can then be inserted back into its socket.

Configuration:

1) Set the V / C dip-switch for the corresponding channel to “V” position for voltage sensor. 10V-out sensor outputs voltage signal.

2) Set the Lg / Sm dip-switch for the corresponding channel to “Lg” position for large signal. 10V-out sensor outputs amplified signal (large signal).

3) Set FIL dip-switch for the corresponding channel to “No filter” position. Apply this filter only when electrical noise becomes a problem at the analog output.

Note: There are four sets of Sensor Signal Configuration dip-switches. Each set is for the corresponding channel.

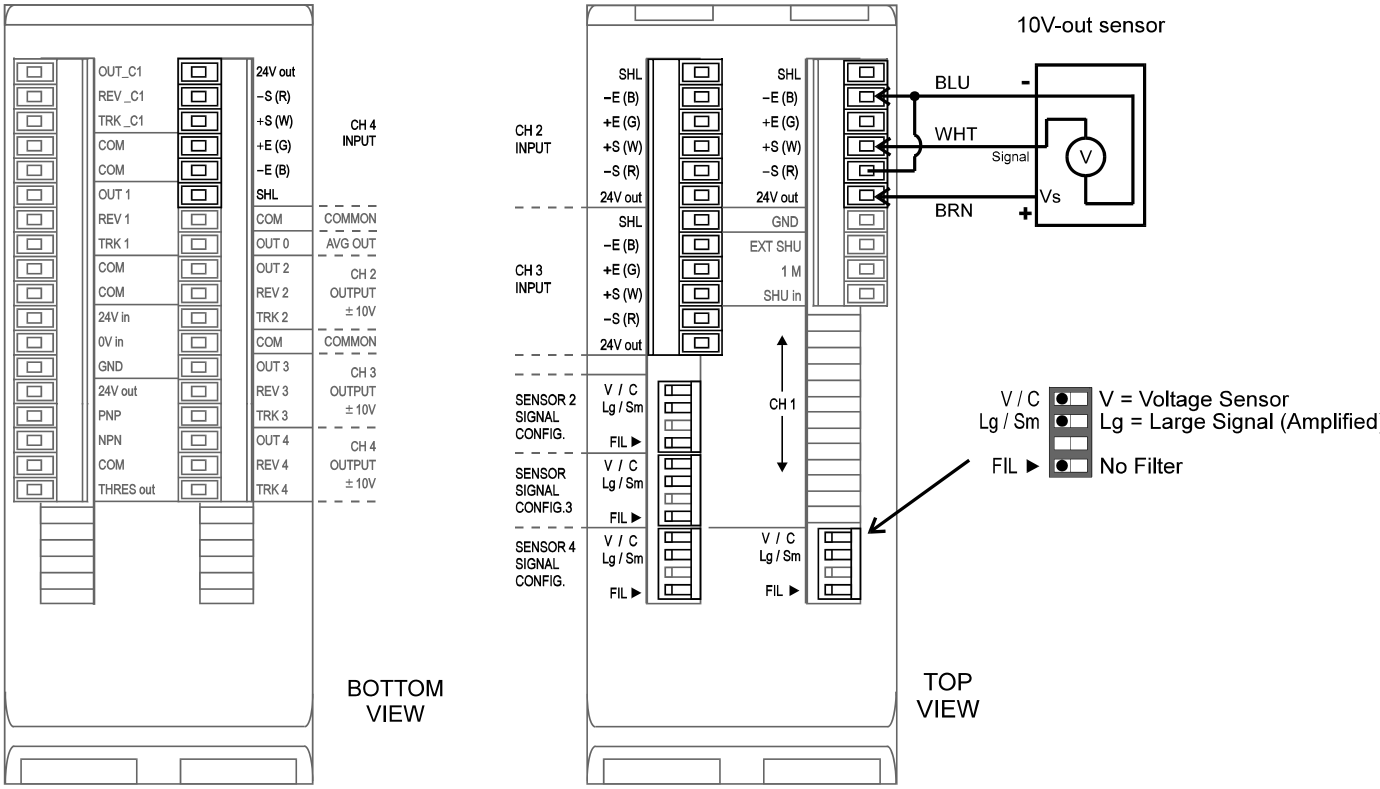
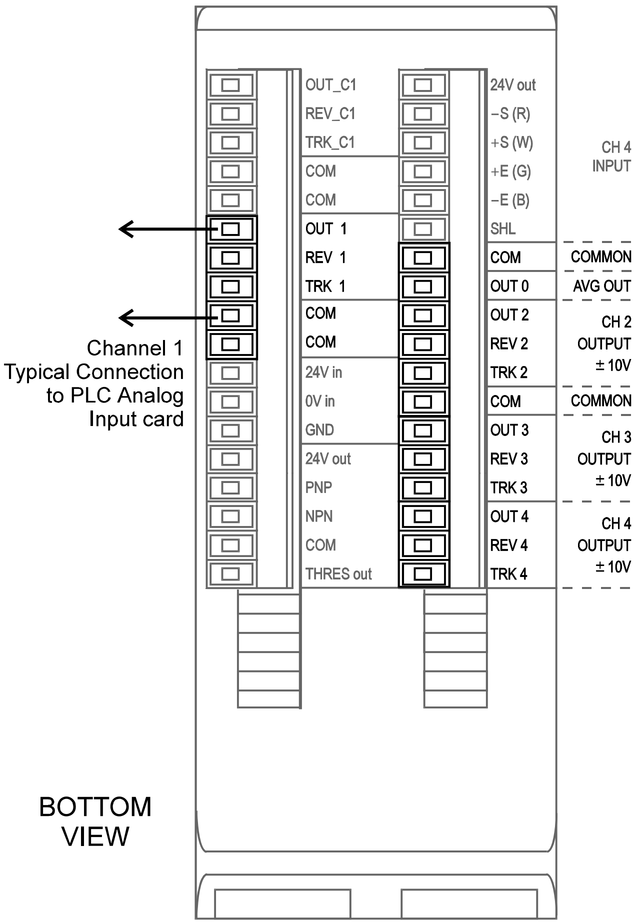


Figure 9: 10V-out Sensor Input

Analog Voltage Output

The analog voltage output is provided on a Phoenix connector for easy access and for interfacing with other peripherals.



Analog Voltage Output:

Swing between ± 10VDC

OUT0 = Normal Output
(Average/Total Channel)

OUT1-4 = Normal Output
(Channel 1 to 4)

REV1-4 = Reverse Output
(Channel 1 to 4)

TRK1-4 = Track Output
(Channel 1 to 4)

COM = Analog Common

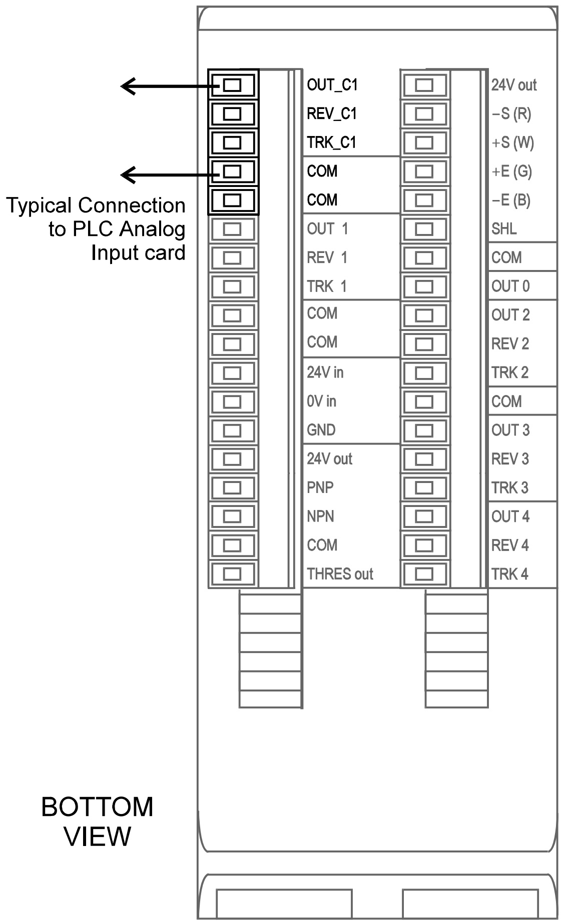
Figure 10: Analog Voltage Output Wiring

Output details:

- OUT terminals output either Peak tonnage or Track tonnage, depending on the TRK/PEAK switch setting on the front panel.
- REV terminals output the reverse peak (snap-through) tonnage when the front panel TRK/PEAK switch is set to PEAK.
- TRK terminals always output the track tonnage, regardless of the front panel TRK/PEAK switch.

Analog Current Output

The analog current output is available in Channel 1 only. It is provided on a Phoenix connector for easy access and for interfacing with other peripherals.



Analog Current Output
(Channel 1 only):

Swing between ± 20mA

OUT_C1 = Normal Output

REV_C1 = Reverse Output

TRK_C1 = Track Output

COM = Analog Common

Figure 11: Analog Current Output Wiring

Output details:

- OUT_C1 terminal outputs either Peak tonnage or Track tonnage, depending on the TRK/PEAK switch setting on the front panel.
- REV_C1 terminal outputs the reverse peak (snap-through) tonnage when the front panel TRK/PEAK switch is set to PEAK.
- TRK_C1 terminal always outputs the track tonnage, regardless of the front panel TRK/PEAK switch.

Triggering – Internal Threshold

The ZT-4 can be triggered by an internal threshold value. When this triggering method is used, the ZT-4 begins monitoring when the Channel 1 load rises above the level determined by the front panel's **Th.H / L** switch. Refer to Figure 12 below to configure the unit for threshold triggering.

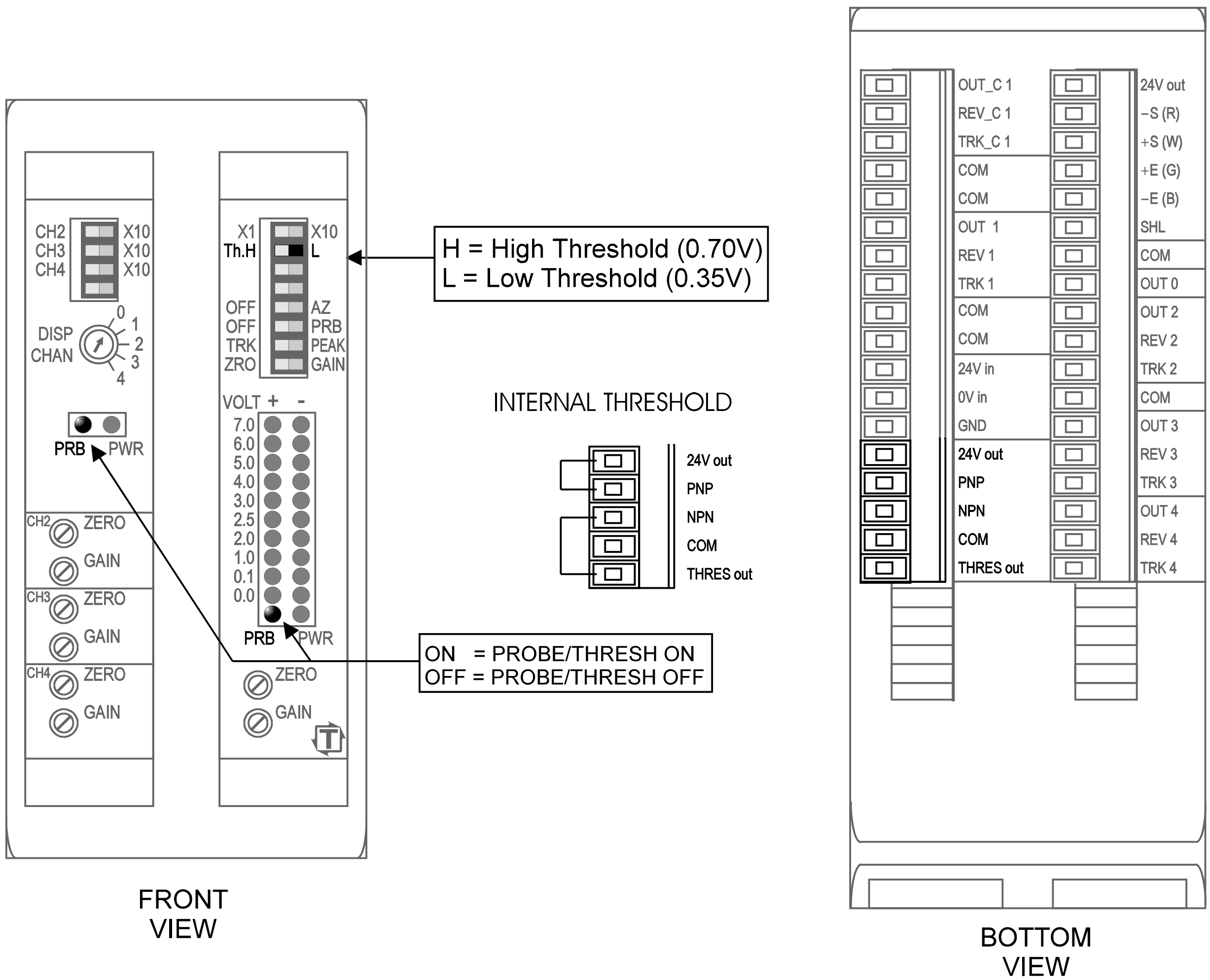


Figure 12: Internal Threshold Wiring

The probe (PRB) indicators should turn on when the Channel 1 load rises above the threshold value, and turn off when the load falls back below the threshold value.

Triggering – External Probe

The ZT-4 can be triggered by an external probe signal. If an external probe is used, the probe supply voltage (+24VDC) is provided by the ZT-4. The figure below illustrates the wiring for a variety of sensing devices.

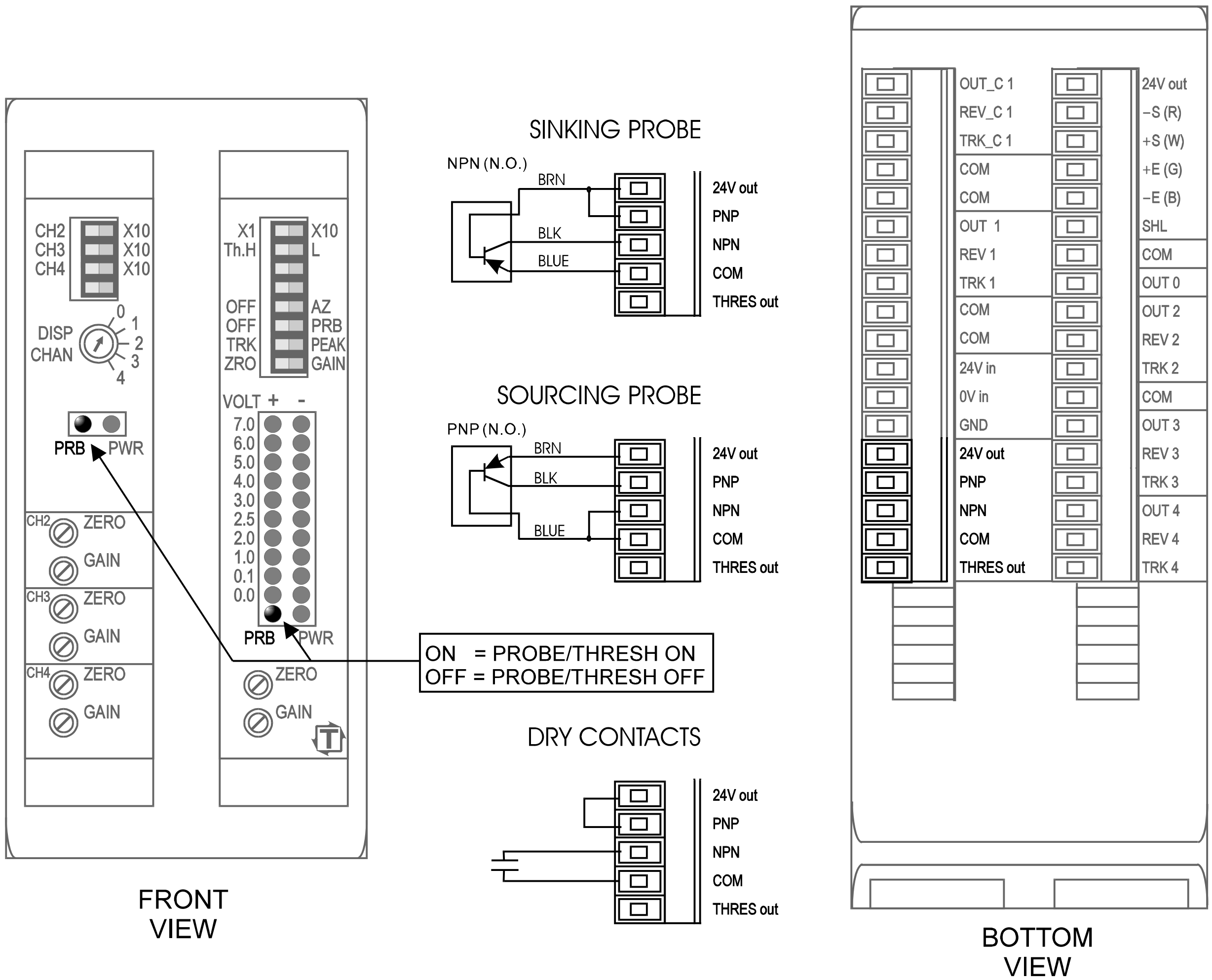


Figure 13: Probe Input Wiring

The probe (PRB) indicators should turn on when the probe turns on, and turn off when the probe turns off.

If the front panel Auto-Zero switch is enabled, the ZT-4 will remain in the auto-zeroing mode of operation until an external probe is applied.

The auto zero feature is important for accurate readings. Over time the press frame will slightly change in its structure. This may be due to temperature or press frame tension. The ZT-4 will compensate for the slight change. It will readjust the zero base line. This zero base line is the no-load value of the press. With a consistent zero value, the tonnage output readings should remain accurate.

When the probe turns on, the ZT-4 opens the window to read a load signal. In peak mode the load level rises to the highest value.

When the probe turns off, the peak level is held at its high level and the auto-zeroing function is resumed (Notice the dotted line below). The peak level is reset the next time the probe transitions from off to on.

The timing of the probe should be such that it turns on just before the machine begins generating a load (140°) and remains on until the load is removed (240°).

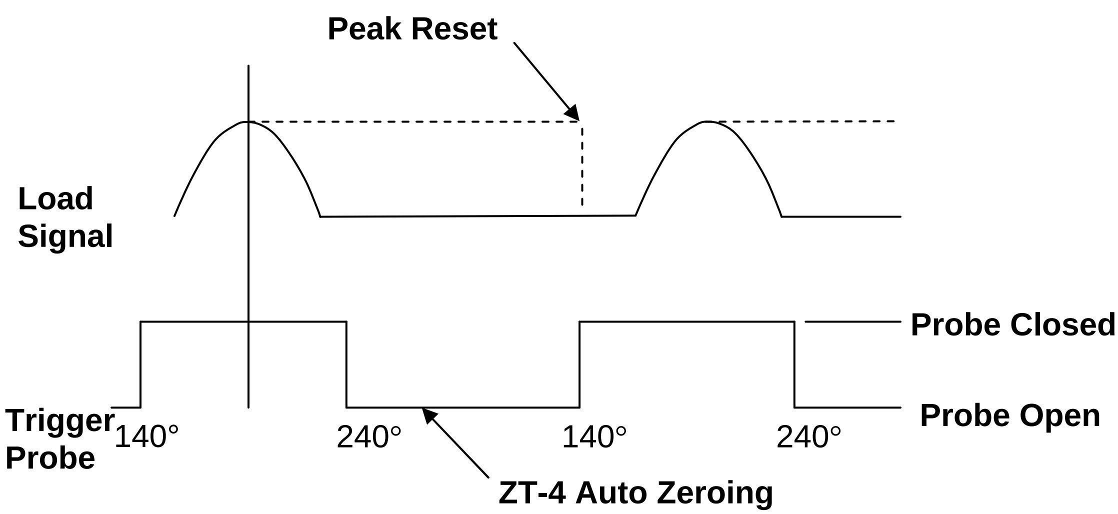
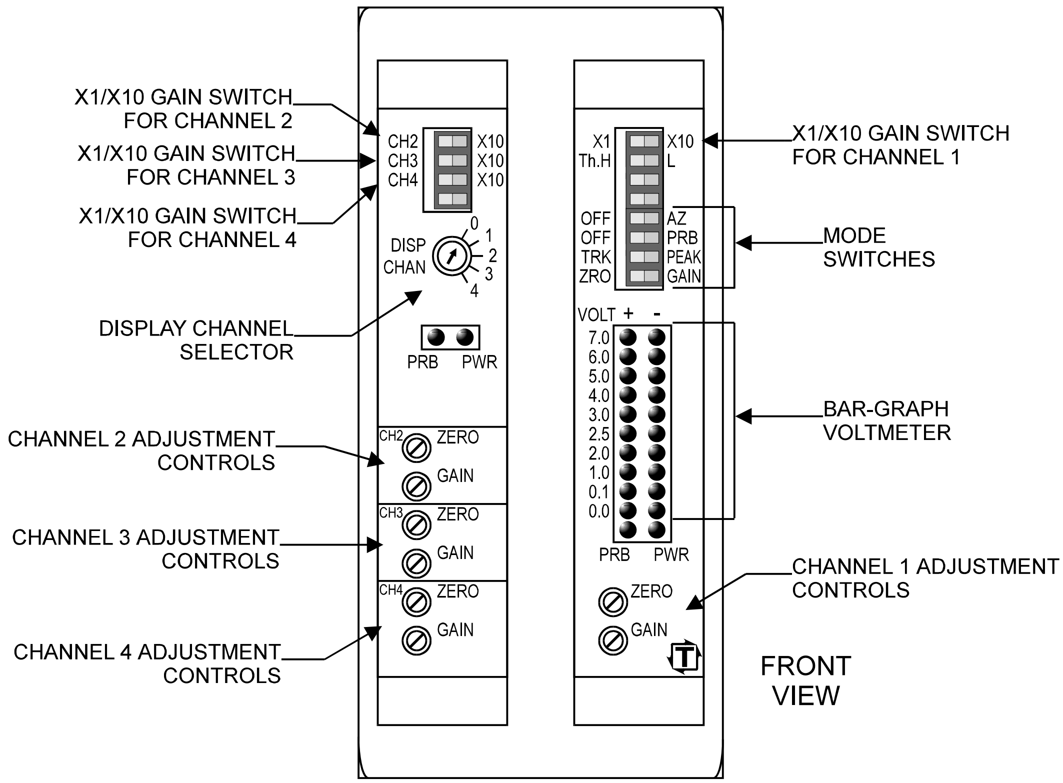


Figure 14: Probe Timing Diagram

➢ Calibration

Front Panel Controls

Refer to the diagram below for control locations.



Notes - Bar-Graph Voltmeter

Normally, a digital voltmeter is used to check the sensor balance, and output voltage during a calibration. The digital voltmeter is connected to the OUTx and COM terminals (see Figure 15).

If calibration accuracy of +/-1% of capacity is acceptable, the built-in Bar-graph voltmeter can be used for calibration.

Let us use the +6.0 VOLT LED in the built-in Bar-graph voltmeter as an example here. When this LED is on, it could mean a voltage anywhere from +6.00 volt to +6.99 volt. But when this LED just changes state from off to on, it indicates an accurate reading of +6.00 volt. This characteristic is useful when you dial the gain pot to adjust the output voltage. This characteristic applies to all LED's in this Bar-graph voltmeter.

In case you need to set the output voltage to +5.50 volt, the Bar-graph voltmeter will not work accurately. You will need to use a digital voltmeter for cases like this.

Calibration Procedures

1) Before calibrating the unit, verify each hardware mentioned in the Installation Section is connected and set up properly.

2) With the sensors placed in the best possible location, (see appendix A), torque the sensors down to 150 in-lbs on the sensor bolts. Do not put the sensor enclosure covers on yet. You will need to test each sensor location.

3) Find the shut height of the press.

   - Jog the press until the ram is at bottom dead center (BDC) or 180º without the load cells or die in the press.

   - Determine the amount of spacers needed with your load cell. Cycle the press without load cells to insure correct height.

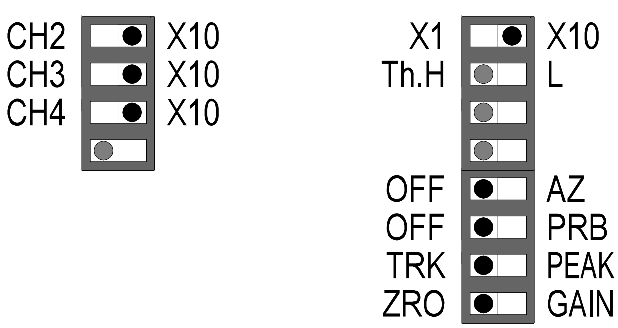
4) Place the load cells in the correct position in the press.

   - All load cells should be equal distance from the sides and front and rear. For example, 12" from the sides, 10" from front and rear. Load cells are typically placed at each corner of the press's bed.

   - Cycle the press without hitting the load cells first.

   - Place cardboard on the top and bottom of the load cells.

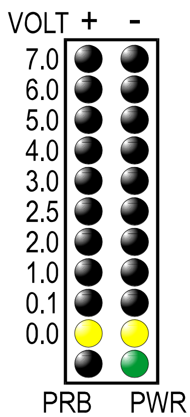
5) Toggle the Mode switches to AZ OFF, PRB OFF, TRACK, ZERO. Also, set all Gain switches to X10 to start.



6) Balance the tonnage sensors.

- Set the Display channel selector to **1** for Channel 1. The Bar-graph voltmeter now shows the balance of Channel 1.

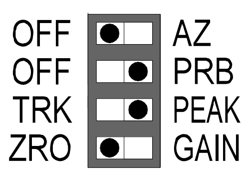
- Adjust the Channel 1 ZERO pot until the bar-graph has only the 2 yellow **0.0V** LEDs lit. This indicates a balanced or zeroed state (see notes on page 25).



- Repeat this step for Channels 2, 3, and 4.

7) Cycle the press.

- Set the Mode switches to AZ OFF, PRB, PEAK, and ZERO.

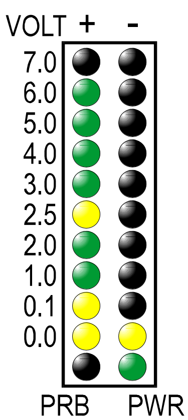


- Further adjust the shut height so that the press impacts the load cells and generates a load at 100% of press capacity. See warning below.

> **<u>WARNING</u>**
> Depending on the press capacity and the size of the load cells being used, loading the press at capacity with load cells could indent the ram or bolster. If this is a concern, you may choose to calibrate the press only up to 80% of capacity.

8) Adjust the gain.

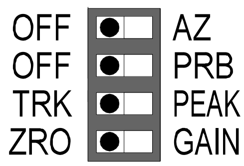
- Set the Display channel selector to **1** for Channel 1.
- Run the press for 2 cycles at capacity.
- Compare the voltage level on the bar-graph with the load cell that corresponds to Channel 1.
- Adjust the Channel 1 GAIN pot.
- Repeat until the desired voltage LED just turns on (see notes on page 25). For example, +6.0V at 100.0 tons.



- If less gain is needed, change the Channel 1 Gain switch to X1, then repeat from Step 4 for this channel only.
- Repeat this step for Channels 2, 3, and 4.

9) Record the Calibration Gain Voltage.

- Set the Mode switches to AZ OFF, PRB OFF, TRACK, and ZERO as shown. Use the Display channel selector, and the Bar-graph voltmeter to verify that each sensor is at zero (see notes on page 25).



- Set the ZRO/GAIN switch to GAIN and use a digital voltmeter to measure the voltage across the OUT1 and COM terminals. Record this value as the Calibration gain voltage for Channel 1. Then do the same for Channel 2, 3 and 4.

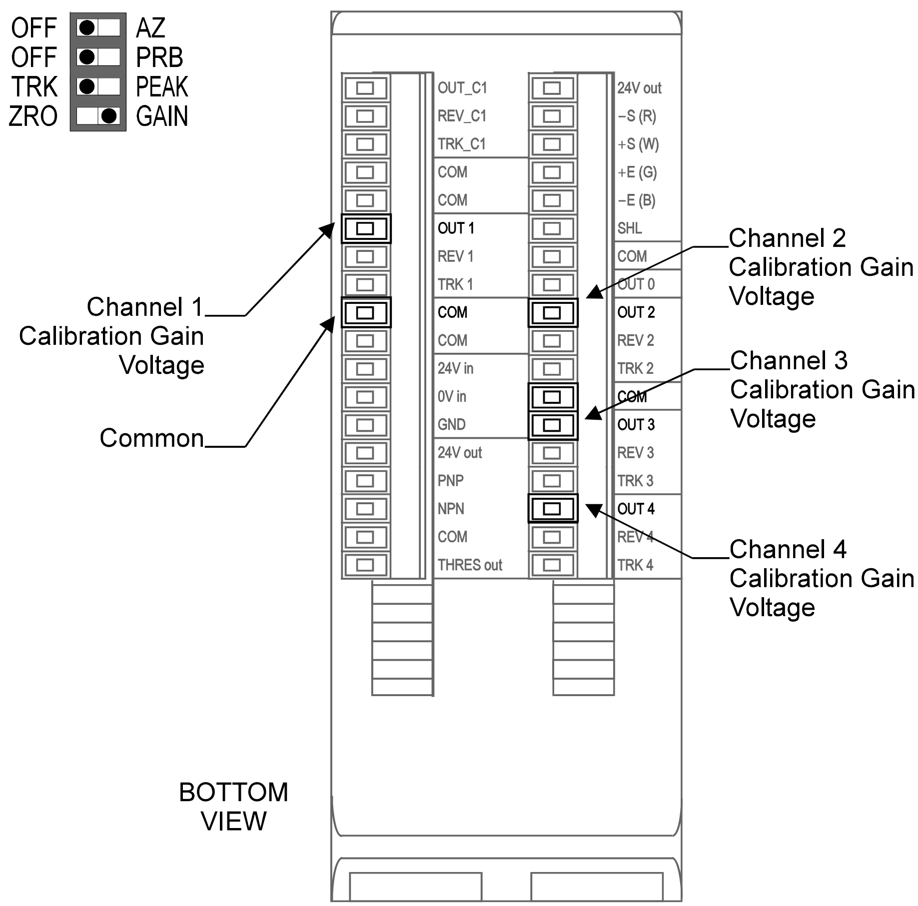
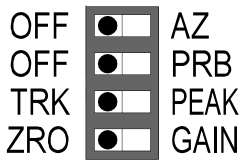


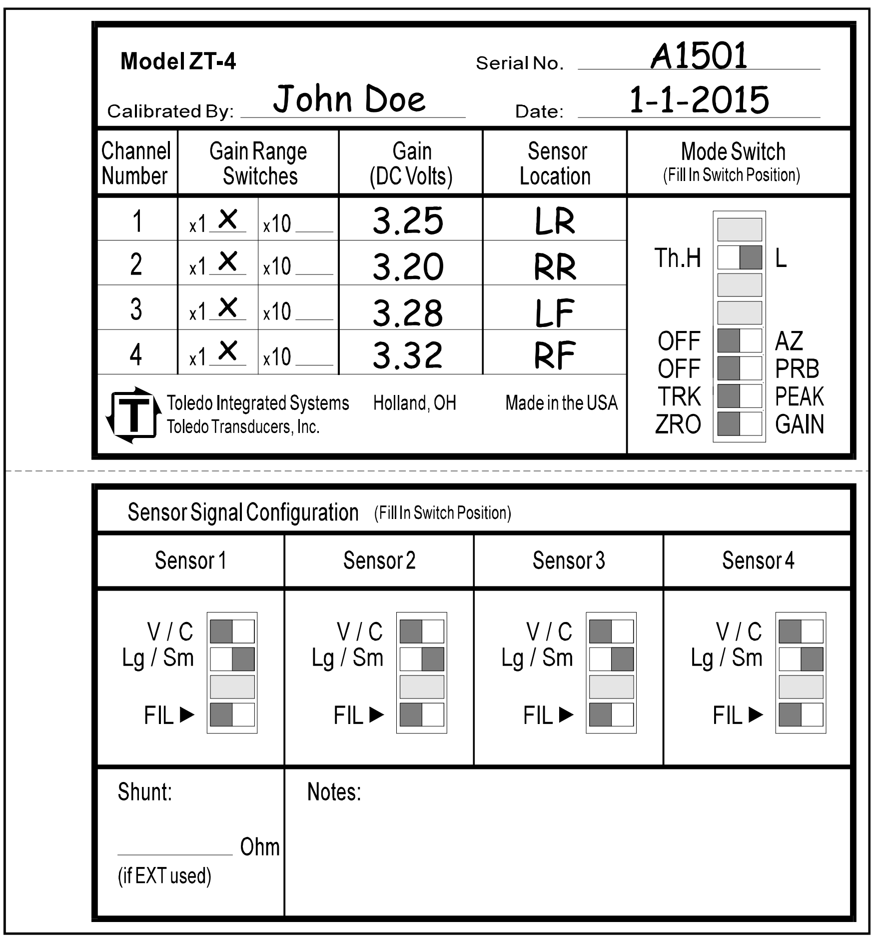
Figure 15: Calibration Gain Voltage Measurement

10) Documentation.

- Fill in the Calibration Card (a sample shown below) which is located in the side pocket.

- Set Mode switches as shown. Calibration is now complete.





Model ZT-4 Serial No. A1501

Calibrated By: John Doe Date: 1-1-2015

Channel Number	Gain Range Switches		Gain (DC Volts)	Sensor Location
1	x1 X	x10	3.25	LR
2	x1 X	x10	3.20	RR
3	x1 X	x10	3.28	LF
4	x1 X	x10	3.32	RF

Mode Switch (Fill In Switch Position)

Th.H L

OFF AZ

OFF PRB

TRK PEAK

ZRO GAIN

Toledo Integrated Systems Holland, OH Made in the USA

Toledo Transducers, Inc.

Sensor Signal Configuration (Fill In Switch Position)

Sensor 1	Sensor 2	Sensor 3	Sensor 4
V / C Lg / Sm FIL ▶	V / C Lg / Sm FIL ▶	V / C Lg / Sm FIL ▶	V / C Lg / Sm FIL ▶

Shunt: ______ Ohm (if EXT used)

Notes:

Figure 16: Calibration Card Sample

Check Calibration

Occasionally, you may need to check the unit's accuracy by verifying the Calibration gain voltage. The Calibration gain voltage is recorded in the calibration card which is located in the side pocket.

To verify the Calibration gain voltage, follow step 9 (page 29) in the Calibration Procedures.

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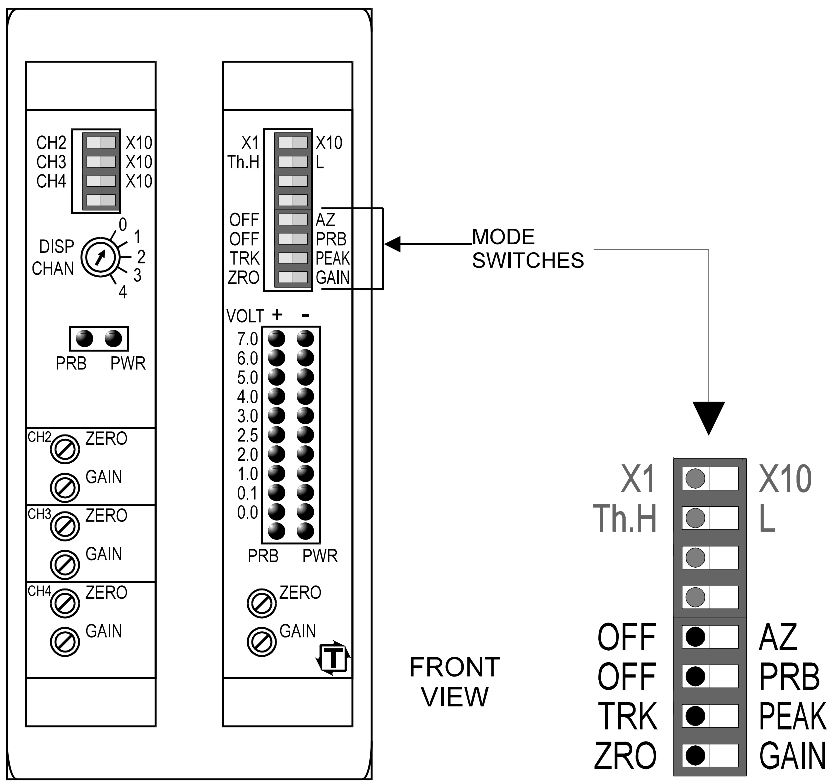
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➢ Operation

Once the ZT-4 has been calibrated, it is ready for continuous use. This section details the setup for Peak Mode and Track Mode operations.

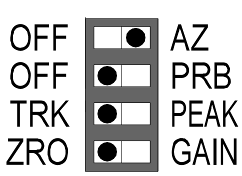
Peak Mode Operation

In Peak mode, the output will increase to the highest load level and remain at that voltage until the probe transitions from off to on again.



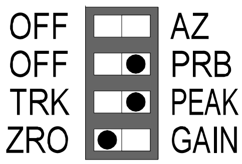
1) Set the Mode switches to AZ OFF, PRB OFF, TRK, and ZRO as shown above.

2) Skip this step if Auto-Zero is not needed.
   a) Toggle the OFF/AZ switch to AZ to start Auto-Zero.



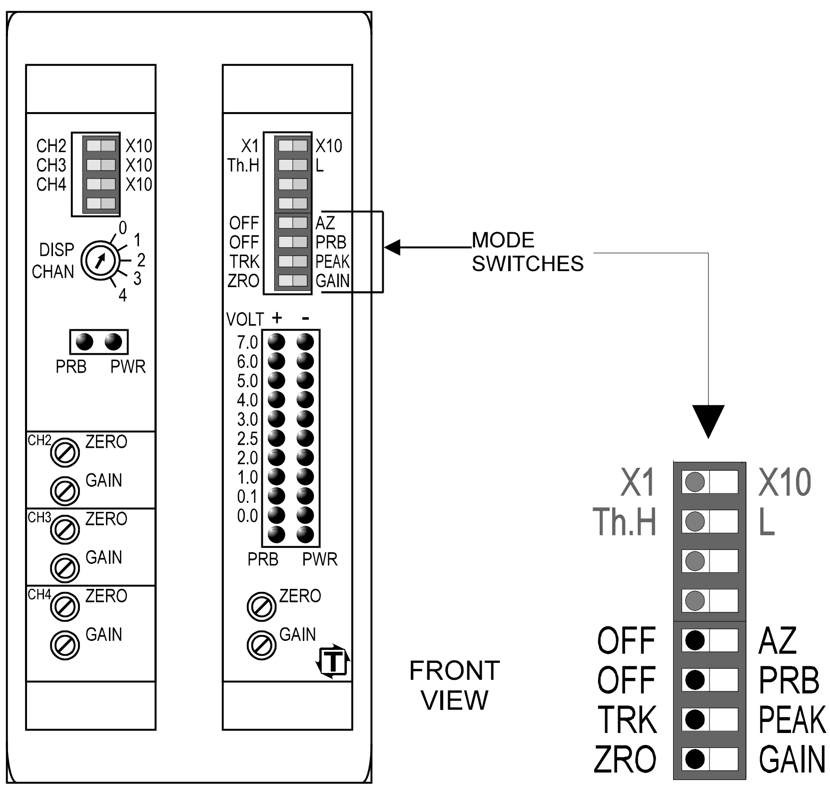
   b) When Auto-Zero is done, only the 2 yellow LEDs at **0.0V** are lit.

3) Set the OFF/PRB switch to PRB and set the TRK/PEAK switch to PEAK. The unit is now ready to run in Peak mode.



Track Mode Operation

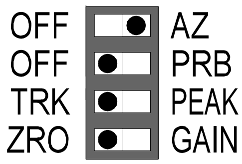
In Track mode, output will follow the loading on the sensors as the load on the machine increases and decreases.



1) Set the Mode switches to AZ OFF, PRB OFF, TRK, and ZRO as shown above.
If Auto-Zero is not needed, skip the following steps. The unit is now ready to run in Track mode.

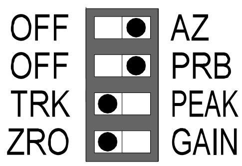
2) If Auto-Zero is needed, then

   a) Toggle the OFF/AZ switch to AZ to start Auto-Zero.



   b) When Auto-Zero is done, only the 2 yellow LEDs at **0.0V** are lit.

3) Set the OFF/PRB switch to PRB. The unit is now ready to run in Track mode.



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Appendix

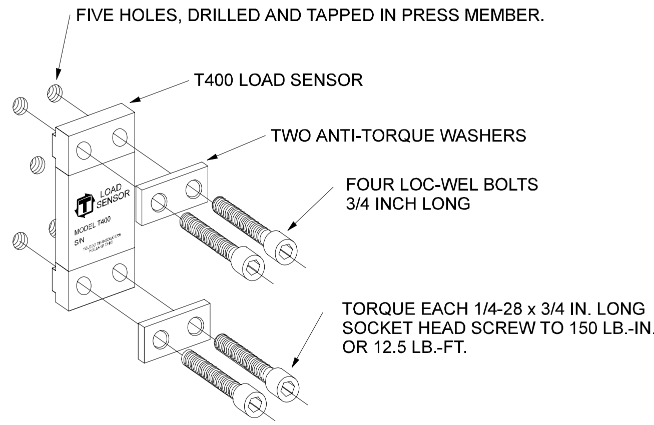
A) Sensor Installation (Doc# 11080)
B) Calibration Sheets (2) (Form# 1224)

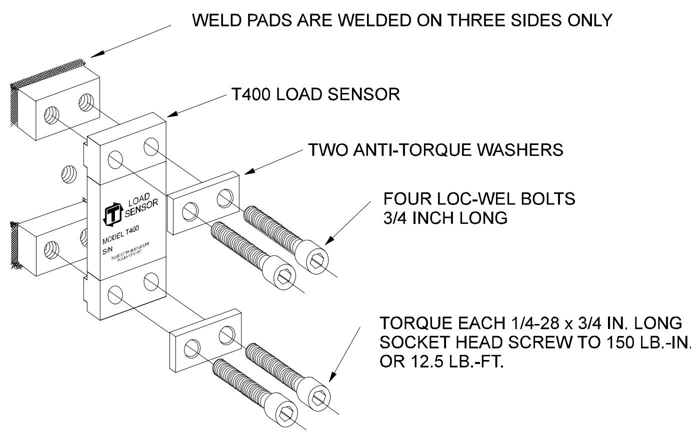
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INSTALLING T400 LOAD SENSORS





The above illustrations represent the proper arrangement of Model T400 Load Sensor kit parts using either the Drill and Tap method or the Weld method.

A proper installation is necessary to produce good results.

Before installing the sensors, please read the appropriate instructions listed below.

NOTES:

1) (2) SENSORS REQUIRED
2) (2) SENSOR ENCLOSURES ARE INCLUDED. THESE HELP PROTECT THE T400 SENSOR GAUGES. THESE ENCLOSURES INCLUDE 1/2" KNOCK-OUT HOLES. IF CONDUIT IS USED, WE SUGGEST USING 1/2" STRAIN RELIEFS IN THE KNOCK-OUT HOLES.

SENSOR PLACEMENT

Sensor location must be determined. You have two locations. The front or the rear of the press. (Shown in the shaded area.)

HOW TO DETERMINE THE BEST LOCATION

* MEASURE THE REAR THICKNESS

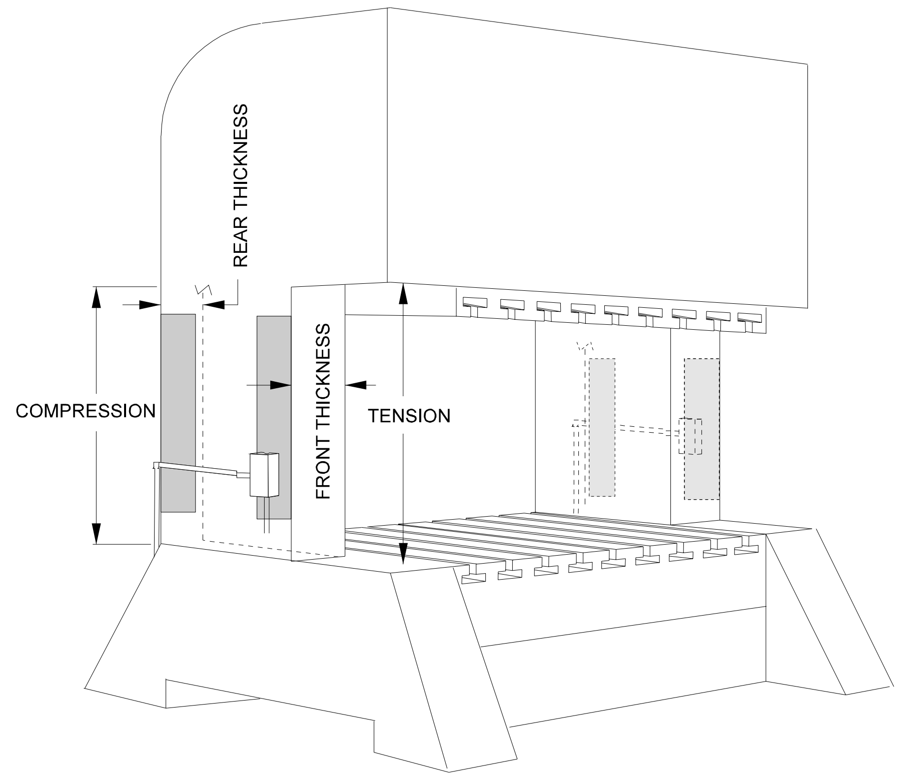
_______REAR

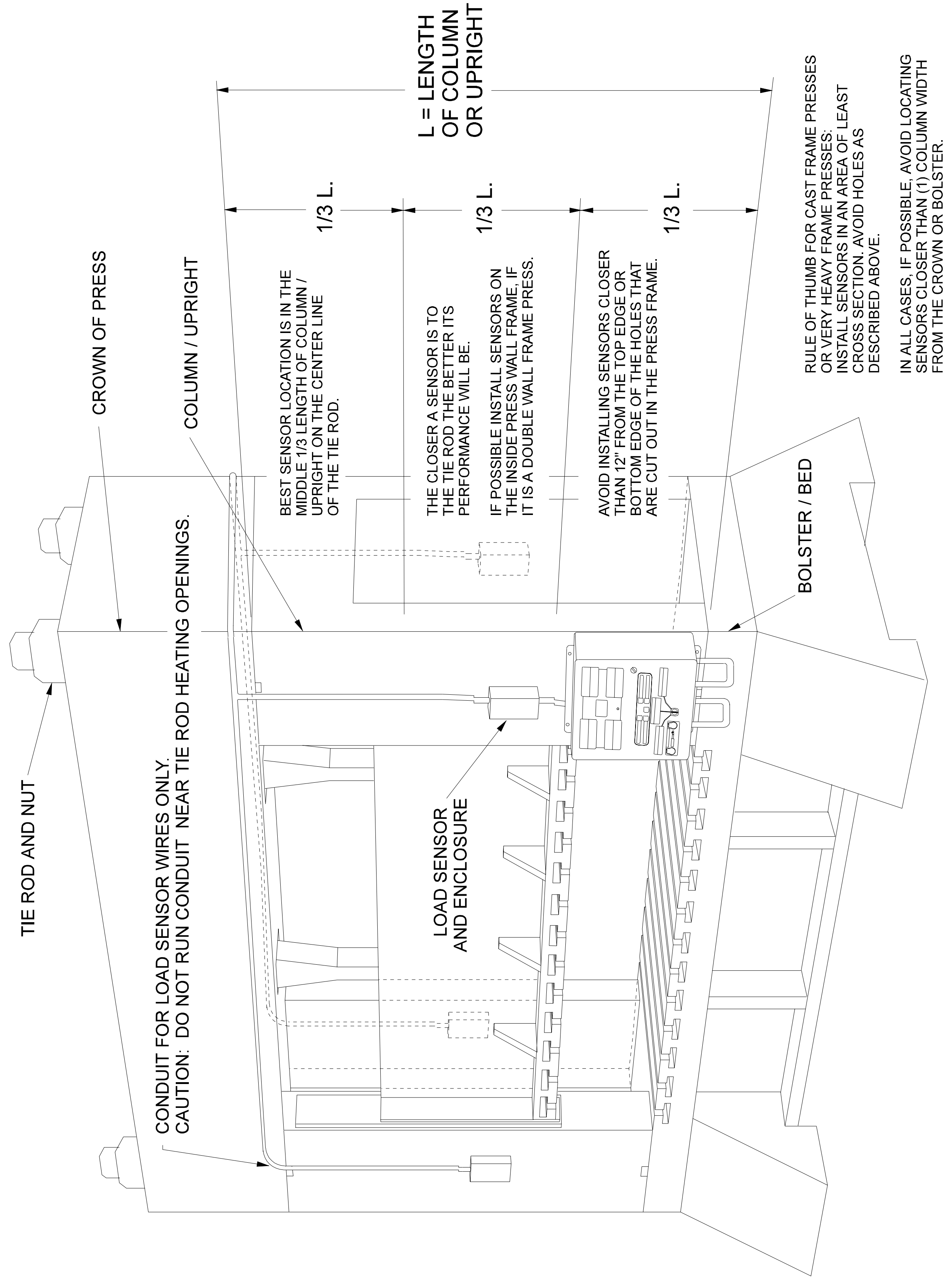
* MULTIPLY BY THREE X 3 = [ ]

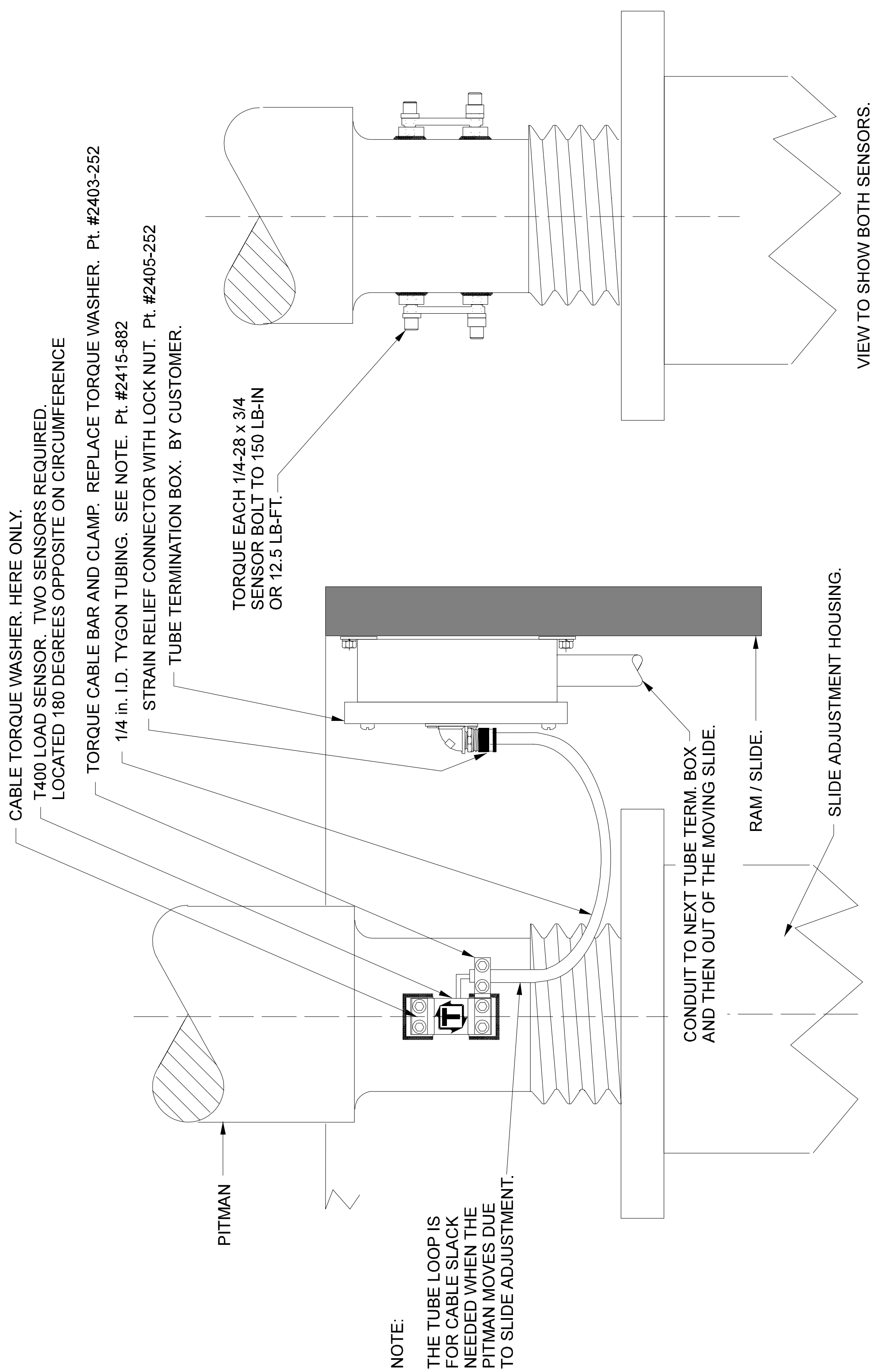
* MEASURE THE FRONT THICKNESS

_______FRONT

If the front thickness is smaller than value in [ ], then mount sensors in the front. (This is the most common.)
If the front thickness is larger, then place the sensor in the rear. Adjust the input connection for compression readings instead of tension.




TIE ROD AND NUT
CROWN OF PRESS
COLUMN / UPRIGHT
CONDUIT FOR LOAD SENSOR WIRES ONLY.
CAUTION: DO NOT RUN CONDUIT NEAR TIE ROD HEATING OPENINGS.
LOAD SENSOR AND ENCLOSURE
BEST SENSOR LOCATION IS IN THE MIDDLE 1/3 LENGTH OF COLUMN / UPRIGHT ON THE CENTER LINE OF THE TIE ROD.
1/3 L.
THE CLOSER A SENSOR IS TO THE TIE ROD THE BETTER ITS PERFORMANCE WILL BE.
IF POSSIBLE INSTALL SENSORS ON THE INSIDE PRESS WALL FRAME, IF IT IS A DOUBLE WALL FRAME PRESS.
1/3 L.
L = LENGTH OF COLUMN OR UPRIGHT
AVOID INSTALLING SENSORS CLOSER THAN 12" FROM THE TOP EDGE OR BOTTOM EDGE OF THE HOLES THAT ARE CUT OUT IN THE PRESS FRAME.
1/3 L.
BOLSTER / BED
RULE OF THUMB FOR CAST FRAME PRESSES OR VERY HEAVY FRAME PRESSES: INSTALL SENSORS IN AN AREA OF LEAST CROSS SECTION. AVOID HOLES AS DESCRIBED ABOVE.
IN ALL CASES, IF POSSIBLE, AVOID LOCATING SENSORS CLOSER THAN (1) COLUMN WIDTH FROM THE CROWN OR BOLSTER.



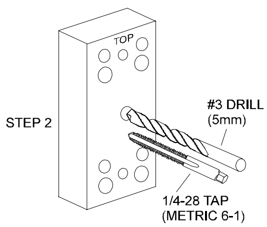
CABLE TORQUE WASHER. HERE ONLY.
T400 LOAD SENSOR. TWO SENSORS REQUIRED. LOCATED 180 DEGREES OPPOSITE ON CIRCUMFERENCE
TORQUE CABLE BAR AND CLAMP. REPLACE TORQUE WASHER. Pt. #2403-252
1/4 in. I.D. TYGON TUBING. SEE NOTE. Pt. #2415-882
STRAIN RELIEF CONNECTOR WITH LOCK NUT. Pt. #2405-252
TUBE TERMINATION BOX. BY CUSTOMER.
TORQUE EACH 1/4-28 x 3/4 SENSOR BOLT TO 150 LB-IN OR 12.5 LB-FT.
PITMAN
NOTE:
THE TUBE LOOP IS FOR CABLE SLACK NEEDED WHEN THE PITMAN MOVES DUE TO SLIDE ADJUSTMENT.
CONDUIT TO NEXT TUBE TERM. BOX AND THEN OUT OF THE MOVING SLIDE.
RAM / SLIDE.
SLIDE ADJUSTMENT HOUSING.
VIEW TO SHOW BOTH SENSORS.

USING THE T400 SENSOR
INSTALLATION FIXTURE KIT No. 1977-749

(METRIC INSTALLATION FIXTURE KIT No. 1974-749)

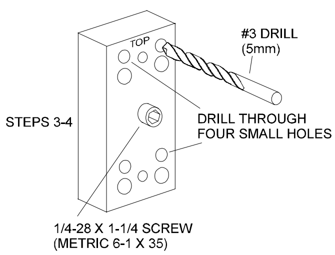
DRILL AND TAP METHOD FOR MOUNTING SENSORS

BE SURE THE SENSOR LOCATION FOLLOWS THE BEST
LOCATION DESCRIBED ON THE PREVIOUS PAGES.



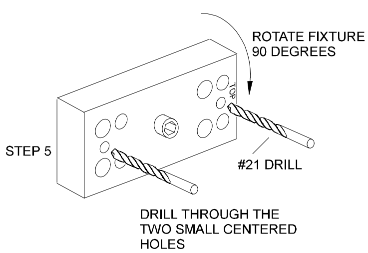
STEP 1 Remove all paint and grease from sensor mount area. If the machine surface is flat (total indicated reading of .002”) and smooth (125 µ in.) the load sensor can be bolted directly to the surface.

STEP 2 Drill and tap the center hole for mounting the fixture to the press member. This hole should be ½ inch (13mm) deep.

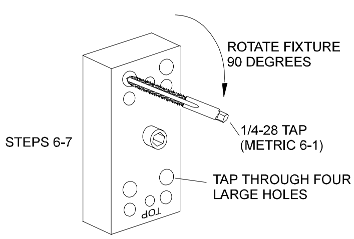


STEP 3 Bolt the fixture to the press member using the ¼-28 by 1-¼ inch (M6-1 x 35) long socket head cap screw in the center of the fixture.

STEP 4 Insert the number 3 drill (5mm) into the smaller corner hole and drill out all four holes to a depth of ¾ of an inch (19mm.)



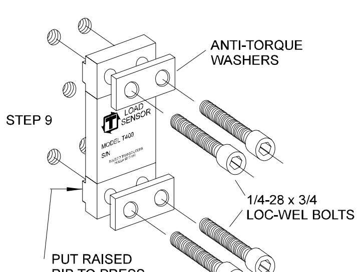
STEP 5 Loosen the fixture. Rotate the fixture 90 degrees clockwise. Tighten the center screw of the fixture. Insert the number 21 drill into the small centered hole and drill out both holes to a depth of 3/8 of an inch. These holes are for mounting the sensor enclosure. The fixture does not allow for tapping these holes. They are tapped without the fixture. Enclosure mounting is not done in metric.



STEP 6 Loosen the fixture. Rotate the fixture another 90 degrees clockwise such that the larger corner holes line up with the holes drilled in Step 4. Insert a tap to be sure the holes line up. Lock the fixture in place by tightening the center screw.

STEP 7 Insert the tap into the larger tap guide holes and tap each hole.

BE SURE TO USE PLENTY OF TAPPING FLUID.



STEP 8 Remove the fixture and repeat Steps 1-7 for each additional sensor mounting position.

STEP 9 Mount the sensor with the raised rib to the press. The anti-torque washers should go between the screw and the sensor body. Torque each ¼-28 x ¾ in. long socket head cap screw to 150 LB.-IN or 12.5 LB.-FT.

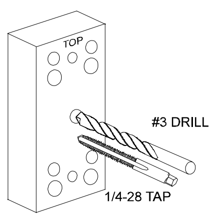
<u>USING THE T400 SENSOR</u>
<u>INSTALLATION FIXTURE KIT No. 1977-749</u>

WELD PAD METHOD FOR MOUNTING SENSORS

BE SURE THE SENSOR LOCATION FOLLOWS THE BEST LOCATION DESCRIBED ON THE PREVIOUS PAGES.

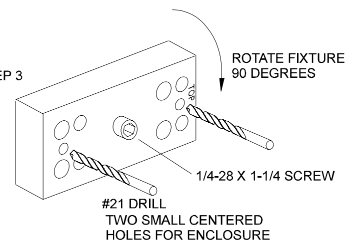
STEP 1 Remove all paint, grease, and or rust from surface to be welded. (Surface should be flat T.I.R. 1/32 of an inch.)

STEP 2



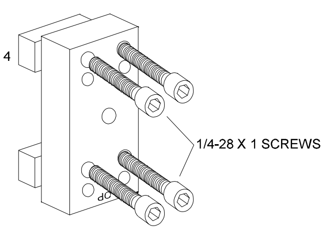
STEP 2 Drill and tap the center hole for mounting the fixture to the press member. This hole should be ½ inch deep. (Optional)

STEP 3



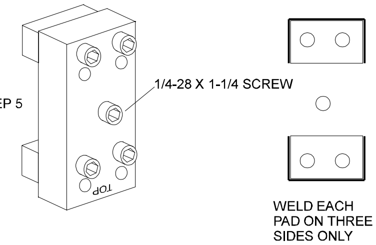
STEP 3 Bolt the fixture to the press member using the ¼-28 by 1-¼ inch long socket head cap screw in the center of the fixture. Orient the fixture as shown and drill out the #21 holes to a depth of 3/8 of an inch for the enclosure mounting. The fixture is not used for tapping these holes. (Optional)

STEP 4



STEP 4 Remove the fixture from the press member. Bolt the weld pads to the fixture with ¼-28 by 1 inch long socket head cap screws provided. Reattach the fixture with the weld pads bolted on using the center hole as in Step 3. Orient the fixture as shown.

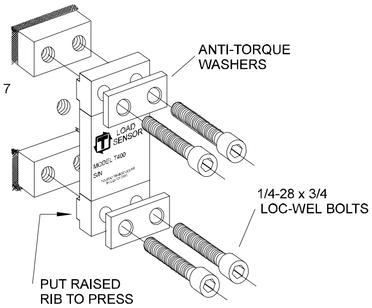
STEP 5



STEP 5 Weld the weld pads to the press member. (BE SURE TO ONLY WELD THE WELD PADS ON THREE SIDES AS SHOWN.) A single pass is sufficient. Do not remove the fixture until slag is removed and or assembly has cooled. When welding cast iron, use a dry nickel rod such as: Lincoln Electric "Soft Weld", Hobart "NI Cast 99", or MB Weld Prod. "MG 210. Strike arc on steel then puddle into the cast iron.

STEP 6 Remove the weld fixture. <u>DO NOT WELD AFTER FIXTURE IS REMOVED.</u> The 4 screws holding the pads to the fixture and the 1 center screw may be discarded. <u>DO NOT USE THE FOUR 1 INCH LONG SCREWS TO ASSEMBLE SENSOR.</u> The sensor kit contains four ¾ inch long screws for assembling the sensor to the press member. Weld pad surface must be clean – no weld bumps, scratches, etc. Be sure the weld pad tapped holes are clean and bottom of holes are free of weld flash.

STEP 7

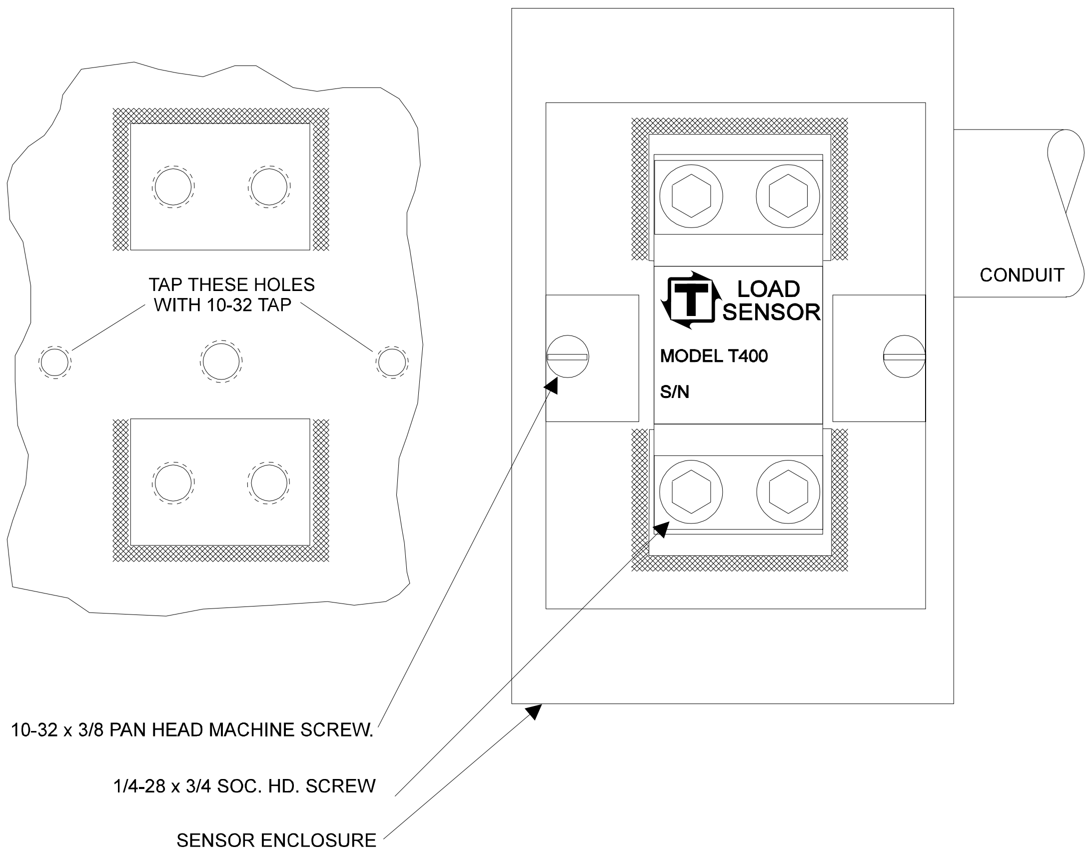


STEP 7 Mount the sensor with the raised rib to the press. The anti-torque washers should go between the screw and the sensor body. Torque each ¼-28 x ¾ in. long socket head screw to 150 LB.-IN or 12.5 LB.-FT.

SENSOR ENCLOSURE MOUNTING

USE 10-32 TAP IN THE TWO 3/8 DEEP HOLES THAT WERE DRILLED WITH THE FIXTURE IN THE PREVIOUS INSTRUCTIONS. MOUNT THE ENCLOSURE TO THE PRESS MEMBER AND RUN 1/2 INCH CONDUIT TO THE LOAD MONITOR ENCLOSURE.

RUN SENSOR CABLE THROUGH CONDUIT. PLACE SENSOR ON MOUNTING HOLES. PLACE ANTI-TORQUE WASHERS OVER SENSOR HOLES. SCREW IN SENSORS BOLTS, (4) EACH, FINGER TIGHT. USE ONLY THE 1/4-28 x 3/4 "LOC-WEL" BOLTS THAT ARE IN THE SENSOR PACKAGE. TORQUE EACH 1/4-28 x 3/4 SCREW TO 150 LB.-IN. OR 12.5LB.-FT. ASSEMBLE BOX COVER.



TOLEDO TRANSDUCERS, INC **PRESS CALIBRATION TEST DATA** HOLLAND, OHIO U.S.A.

COMPANY: ______________________ **DATE:** ______________________

______________________ **PRESS SERIAL No:** ______________________

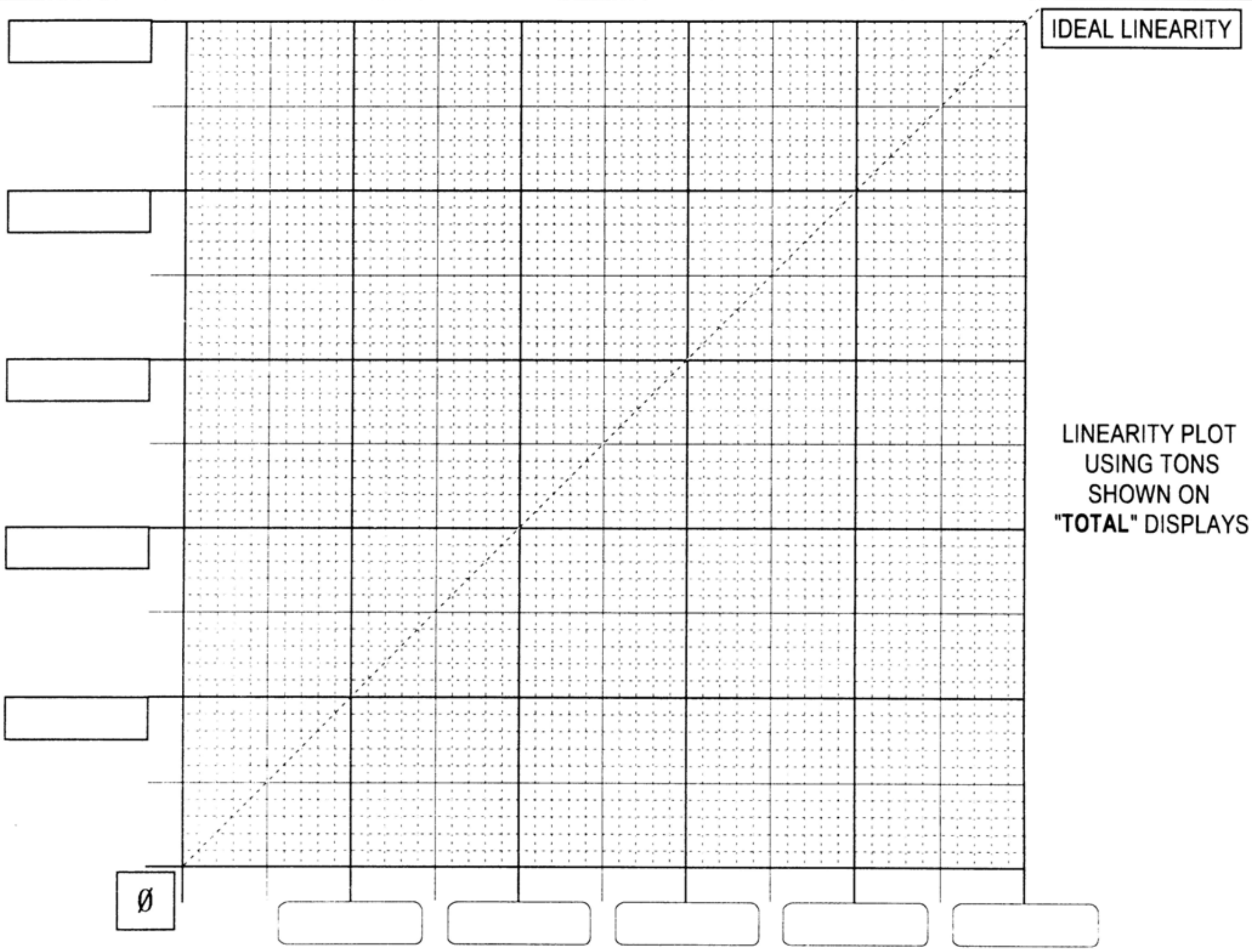
______________________ **PRESS (Type and & No.):** ______________________

CONTACT: ______________________ **PRESS CAPACITY:** ______________________

PHONE: (____) ______________________ **LOAD MONITOR MODEL:** ______________________

SERVICE ORDER #: ______________________ **MONITOR SERIAL No.** ______________________

SLIDE-ADJUST INDICATOR	TONNAGE APPLIED TO **LOAD CELLS** ON PRESS				TONNAGE DISPLAYED ON **LOAD MONITOR**			
	LR	TOTAL		RR	LR	TOTAL		RR
	LF			RF	LF			RF
	LR	TOTAL		RR	LR	TOTAL		RR
	LF			RF	LF			RF
	LR	TOTAL		RR	LR	TOTAL		RR
	LF			RF	LF			RF
	LR	TOTAL		RR	LR	TOTAL		RR
	LF			RF	LF			RF



"**TOTAL**" LOAD DISPLAYED ON MONITOR

LINEARITY PLOT USING TONS SHOWN ON "**TOTAL**" DISPLAYS

"**TOTAL**" TONNAGE APPLIED TO LOAD CELLS ON PRESS

DRAW IN :

- CHANNEL NUMBER
- SENSOR LOCATION
- MONITOR LOCATION
- LOAD CELL LOCATION
- DIRECTION OF MATL. FLOW

SHUNT RESISTORS:

ONE MEG ? YES ___ NO___

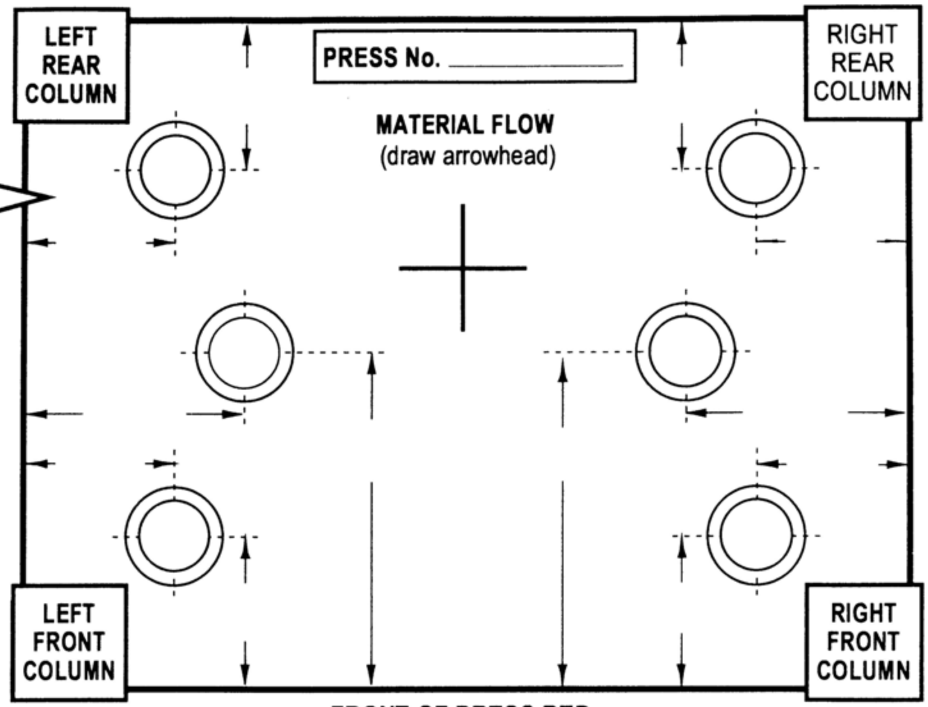
OTHER RESISTORS:

CHAN. 1 ____________

CHAN. 2 ____________

CHAN. 3 ____________

CHAN. 4 ____________



FRONT OF PRESS BED

TYPE OF LOAD CELLS: ____________ **TYPE OF LOAD CELL READOUT:** ____________

TONNAGE SENSORS

SENSOR NUMBER	SERIAL NO.	CAL. NO.	X 10	LOCATION (LF, RF, LR, RR)
1				
2				
3				
4				

CALIBRATION LOAD CELLS

CELL NUMBER	CAPACITY TONS	SERIAL NO.	CAL. NO.
①			
②			
③			
④			

CCM TYPE: ________ **CCM OFFSET:** ________ **STI REFERENCE NUMBER:** LOW: ________ HIGH: ________

STI DEGREES IN CHANNEL No. 1: ____________

TRIGGERED FROM PROBE ? YES___ NO ___ (Show threshold value if not triggered from probe): ____________

TRIPPED ALARM RELAY STOPS PRESS ? YES___ NO___ EXPLAIN: ____________

ALL STICKERS AND DOCUMENTS FILLED OUT ? YES___ NO___ **IF NOT, EXPLAIN WHY:** ____________

TFP No.: HIGH 2____ LOW 2 ____ HIGH 4 ____ LOW 4 ____ HIGH 6____ LOW 6____ HIGH 8____ LOW 8 ____

COMMENTS: ____________

TESTS MADE BY: ____________ **TESTS ACCEPTED BY:** ____________ **DATE:** ________

MAIL ADDRESS:

TOLEDO TRANSDUCERS, INC.
P.O. BOX 10
HOLLAND, OHIO 43528

SHIPPING ADDRESS:

TOLEDO TRANSDUCERS, INC.
6834 SPRING VALLEY DR.
HOLLAND, OHIO 43528

PHONE: 1 (419) 867-4170
FAX: 1 (419) 867-4180

TOLEDO TRANSDUCERS, INC **PRESS CALIBRATION TEST DATA** HOLLAND, OHIO U.S.A.

COMPANY: ______________________________

____

____

CONTACT: ______________________________

PHONE: (____) ______________________________

SERVICE ORDER #: ______________________________

DATE: ______________________________

PRESS SERIAL No: ______________________________

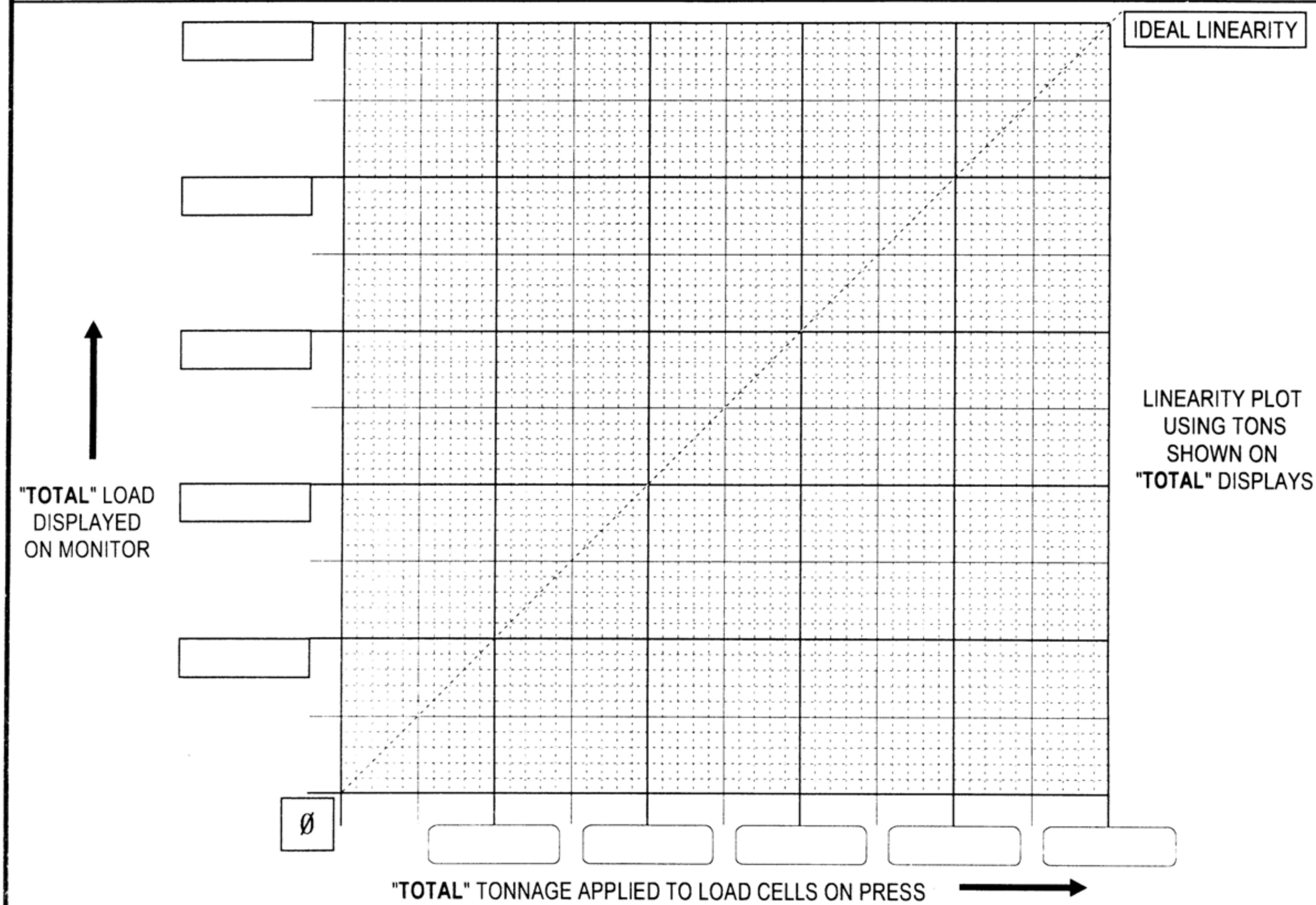
PRESS (Type and & No.): ______________________________

PRESS CAPACITY: ______________________________

LOAD MONITOR MODEL: ______________________________

MONITOR SERIAL No. ______________________________

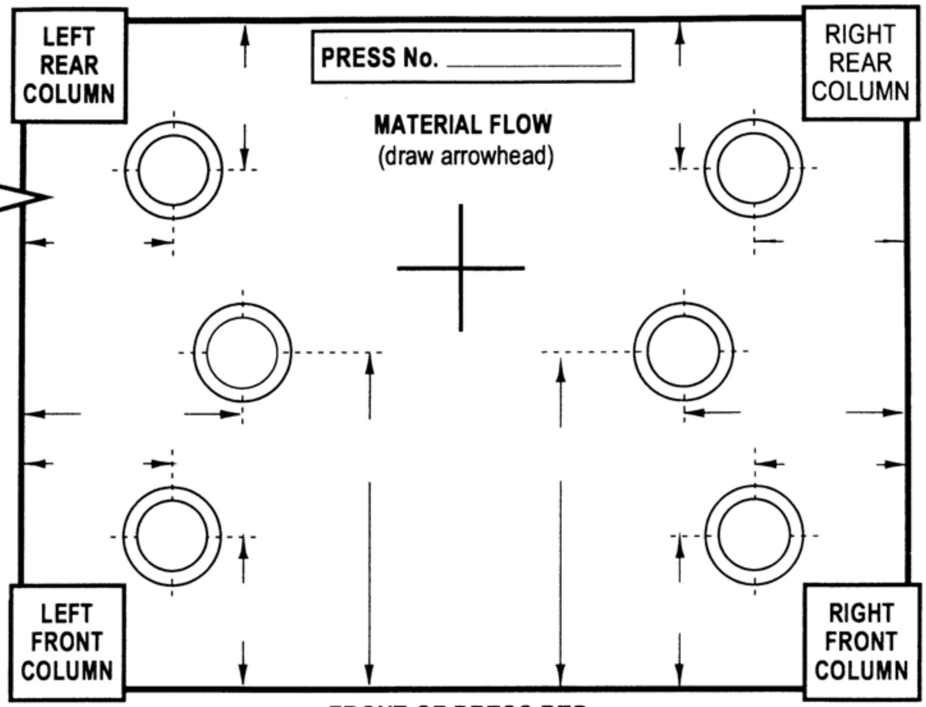
SLIDE-ADJUST INDICATOR	TONNAGE APPLIED TO **LOAD CELLS** ON PRESS					TONNAGE DISPLAYED ON **LOAD MONITOR**				
	LR		TOTAL		RR	LR		TOTAL		RR
	LF				RF	LF				RF
	LR		TOTAL		RR	LR		TOTAL		RR
	LF				RF	LF				RF
	LR		TOTAL		RR	LR		TOTAL		RR
	LF				RF	LF				RF
	LR		TOTAL		RR	LR		TOTAL		RR
	LF				RF	LF				RF



LINEARITY PLOT USING TONS SHOWN ON **"TOTAL"** DISPLAYS

DRAW IN :

- CHANNEL NUMBER
- SENSOR LOCATION
- MONITOR LOCATION
- LOAD CELL LOCATION
- DIRECTION OF MATL. FLOW



FRONT OF PRESS BED

SHUNT RESISTORS:

ONE MEG ? YES ___ NO___

OTHER RESISTORS:

CHAN. 1 ______________

CHAN. 2 ______________

CHAN. 3 ______________

CHAN. 4 ______________

TYPE OF LOAD CELLS: ______________________ **TYPE OF LOAD CELL READOUT:** ______________________

TONNAGE SENSORS

SENSOR NUMBER	SERIAL NO.	CAL. NO.	X 10	LOCATION (LF, RF, LR, RR)
1				
2				
3				
4				

CALIBRATION LOAD CELLS

CELL NUMBER	CAPACITY TONS	SERIAL NO.	CAL. NO.
①			
②			
③			
④			

CCM TYPE: __________ **CCM OFFSET:** __________ **STI REFERENCE NUMBER:** LOW: __________ HIGH: __________

STI DEGREES IN CHANNEL No. 1: ______________

TRIGGERED FROM PROBE ? YES___ NO ___ (Show threshold value if not triggered from probe): ______________

TRIPPED ALARM RELAY STOPS PRESS ? YES___ NO___ EXPLAIN: ______________________

ALL STICKERS AND DOCUMENTS FILLED OUT ? YES___ NO___ **IF NOT, EXPLAIN WHY:** ______________

TFP No.: HIGH 2 ____ LOW 2 ____ HIGH 4 ____ LOW 4 ____ HIGH 6 ____ LOW 6 ____ HIGH 8 ____ LOW 8 ____

COMMENTS: ____

____

____

____

TESTS MADE BY: ______________________ **TESTS ACCEPTED BY:** ______________________ **DATE:** ________

MAIL ADDRESS:

TOLEDO TRANSDUCERS, INC.
P.O. BOX 10
HOLLAND, OHIO 43528

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